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High Protonic Conduction in Two Metal–Organic Frameworks Contained High-Density Carboxylic Groups

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Supporting Information

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Table S1. Proton Conductivities ($S \cdot cm^{-1}$) of **1** at Different RHs and Temperatures.

	RH (%)				
temp (°C)	68	75	85	93	98
30	1.10×10^{-7}	1.26×10^{-7}	2.53×10^{-7}	5.32×10^{-7}	9.36×10^{-7}
40	1.51×10^{-7}	6.07×10^{-7}	8.55×10^{-7}	8.75×10^{-7}	1.43×10^{-6}
50	6.22×10^{-7}	6.23×10^{-7}	1.00×10^{-6}	1.54×10^{-6}	2.05×10^{-6}
60	1.87×10^{-6}	2.40×10^{-6}	3.07×10^{-6}	4.53×10^{-6}	7.09×10^{-6}
70	2.51×10^{-6}	3.34×10^{-6}	5.88×10^{-6}	1.22×10^{-5}	2.08×10^{-5}
80	4.58×10^{-6}	5.50×10^{-6}	1.52×10^{-5}	3.81×10^{-5}	3.47×10^{-4}
90	7.39×10^{-6}	1.40×10^{-5}	3.93×10^{-5}	9.41×10^{-5}	1.16×10^{-3}
100	1.43×10^{-5}	4.03×10^{-5}	1.65×10^{-4}	6.11×10^{-4}	1.9×10^{-3}

Table S2. Proton Conductivities ($S \cdot cm^{-1}$) of **2** at Different RHs and Temperatures.

	RH (%)			
temp (°C)	75	85	93	98
30	8.40×10^{-9}	3.16×10^{-8}	5.53×10^{-8}	9.15×10^{-6}
40	1.25×10^{-8}	7.92×10^{-8}	9.49×10^{-8}	1.03×10^{-5}
50	3.90×10^{-8}	1.48×10^{-7}	4.36×10^{-7}	1.21×10^{-5}
60	1.45×10^{-7}	1.85×10^{-7}	6.05×10^{-6}	1.61×10^{-5}
70	1.28×10^{-6}	2.12×10^{-6}	5.46×10^{-5}	2.51×10^{-5}
80	4.10×10^{-6}	1.11×10^{-5}	9.00×10^{-5}	9.74×10^{-5}
90	1.19×10^{-5}	5.40×10^{-5}	1.23×10^{-4}	1.77×10^{-4}
100	3.54×10^{-5}	1.06×10^{-4}	1.66×10^{-4}	1.07×10^{-3}

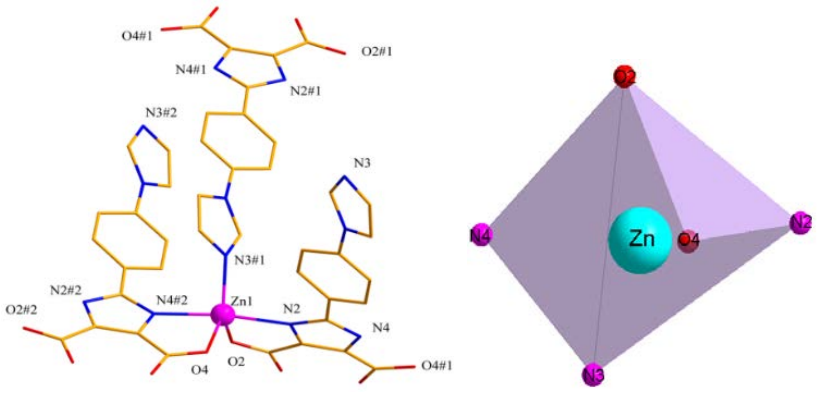


Fig. S1 (a) Coordination environment of Zn^{2+} atom in **1** (H atoms omitted for clarity).

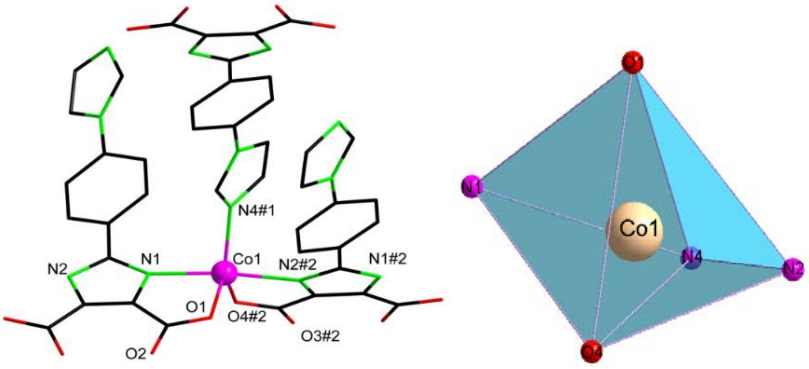


Fig. S2 Coordination environment of Co^{2+} atom in **2** (H atoms omitted for clarity).

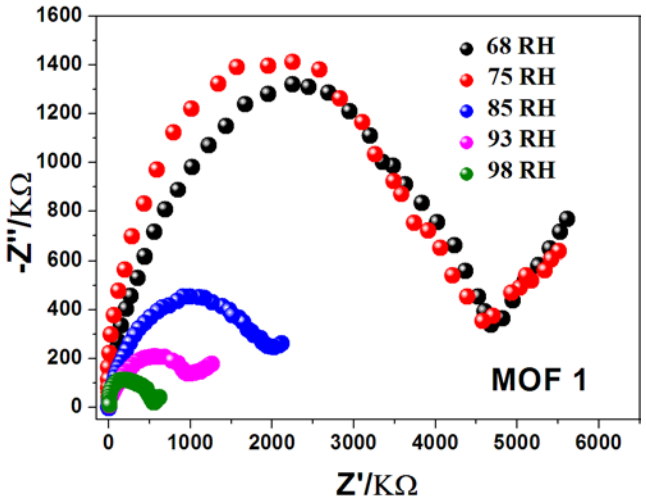


Fig. S3 Impedance spectra of **2** at 68-98% RH and 100 °C.

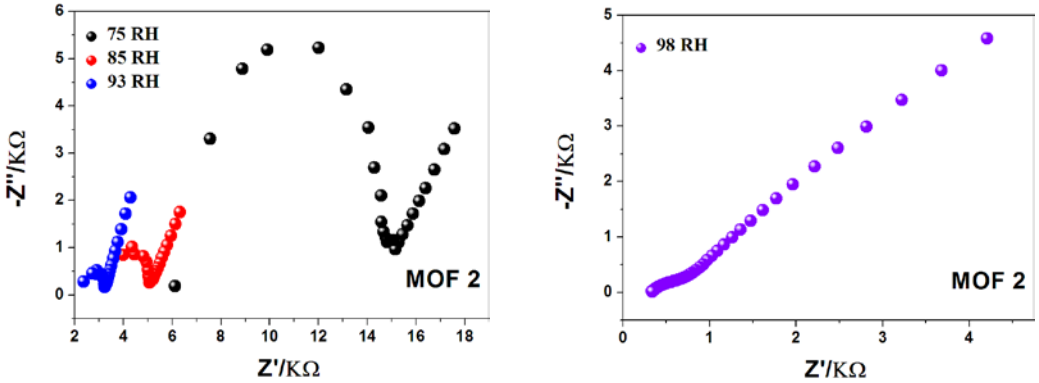


Fig.S4 Impedance spectra of **2** at 75-98% RHs and 100 °C.

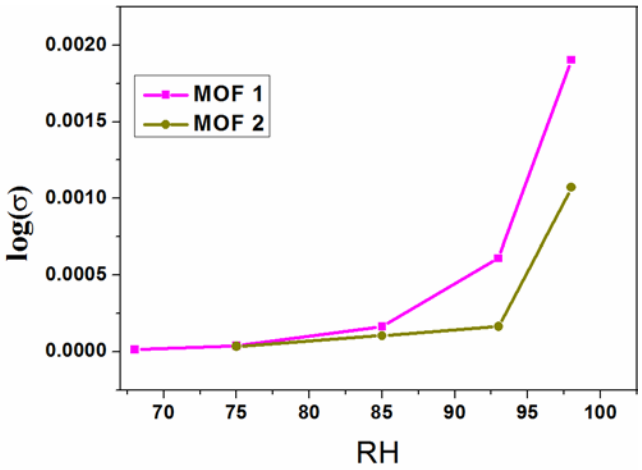


Fig.S5 Humidity dependence of the proton conductivities for **1** and **2** at 100 °C.

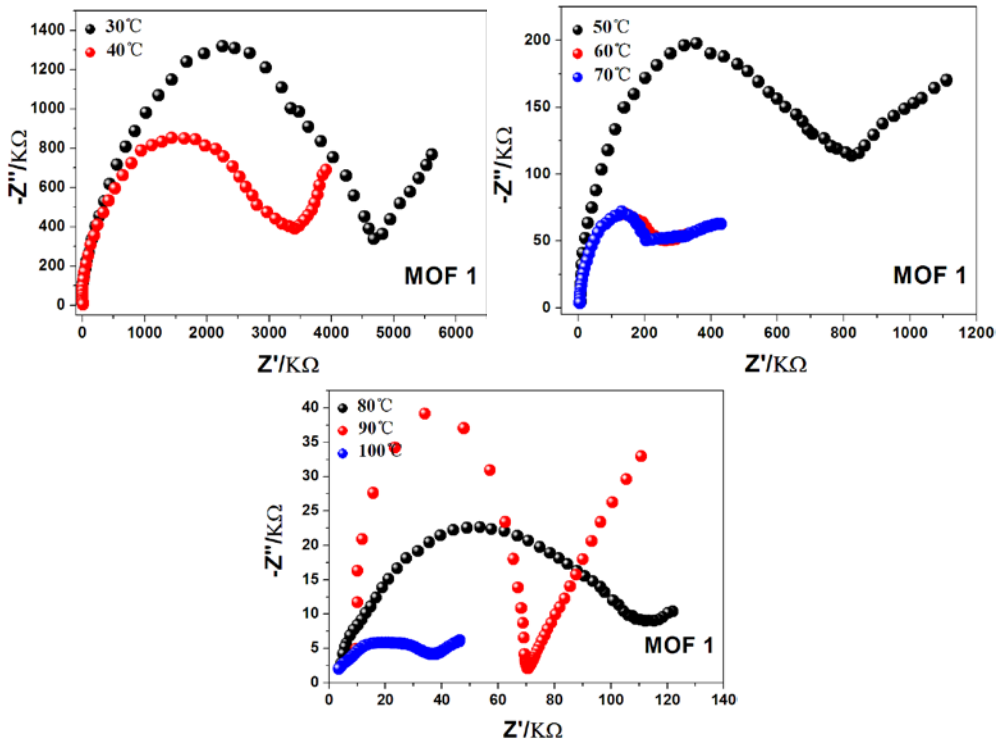


Fig. S6 Impedance spectra of **1** at 30-100 °C and 68% RH.

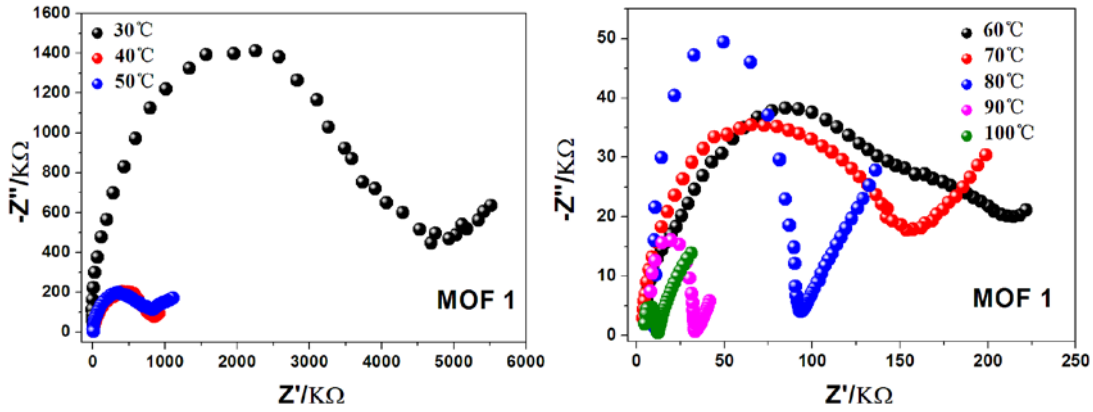


Fig. S7 Impedance spectra of **1** at 30-100 °C and 75% RH.

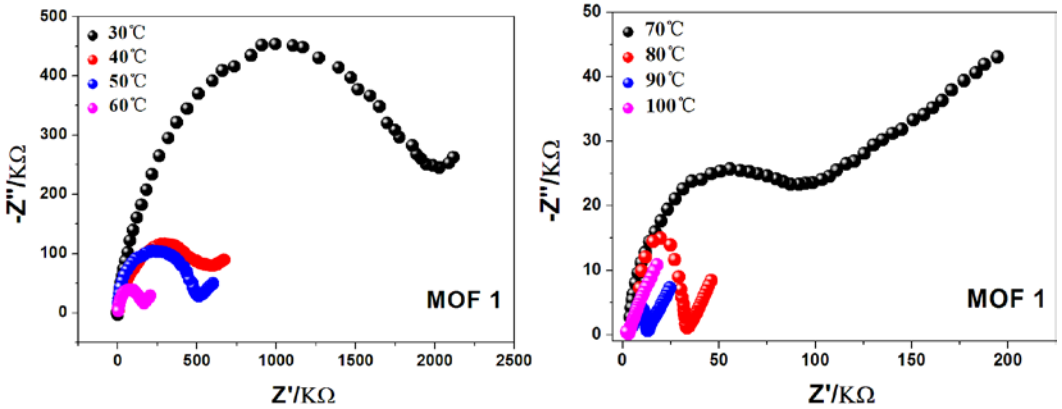


Fig. S8 Impedance spectra of **1** at 30-100 °C and 85% RHs.

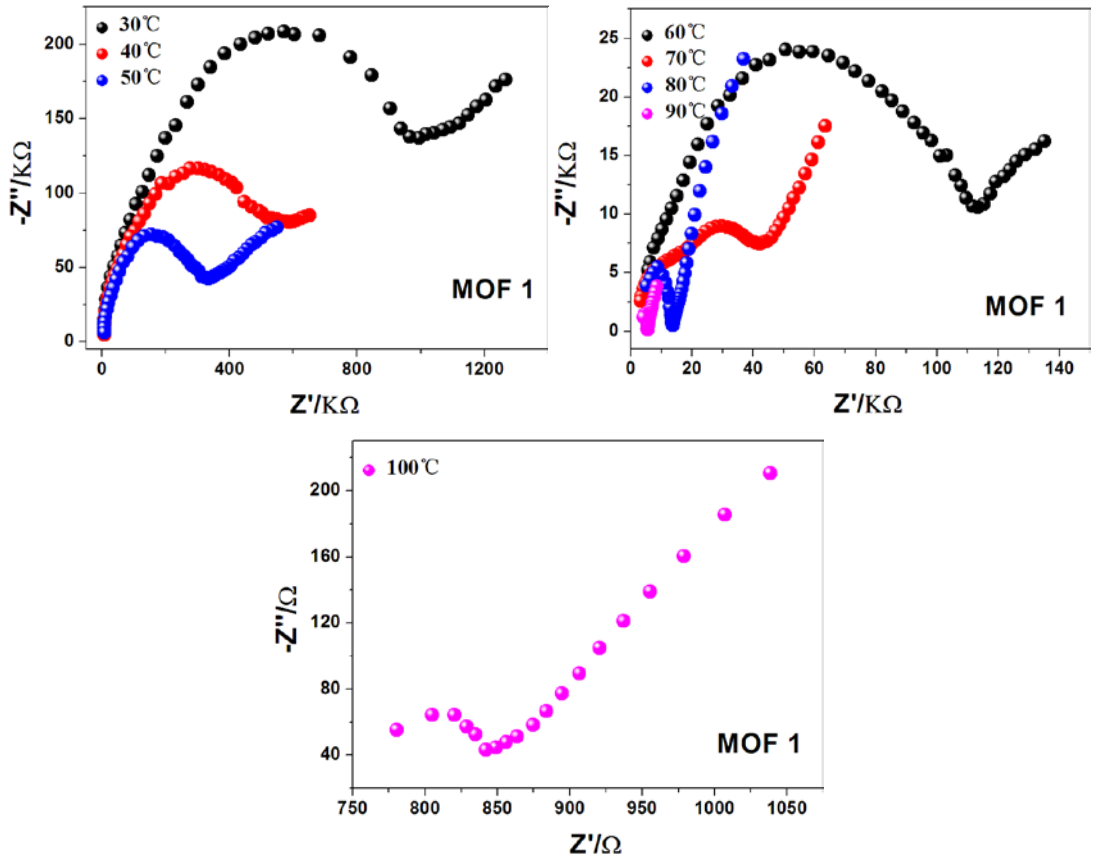


Fig. S9 Impedance spectra of **1** at 30-100 °C under 93% RH.

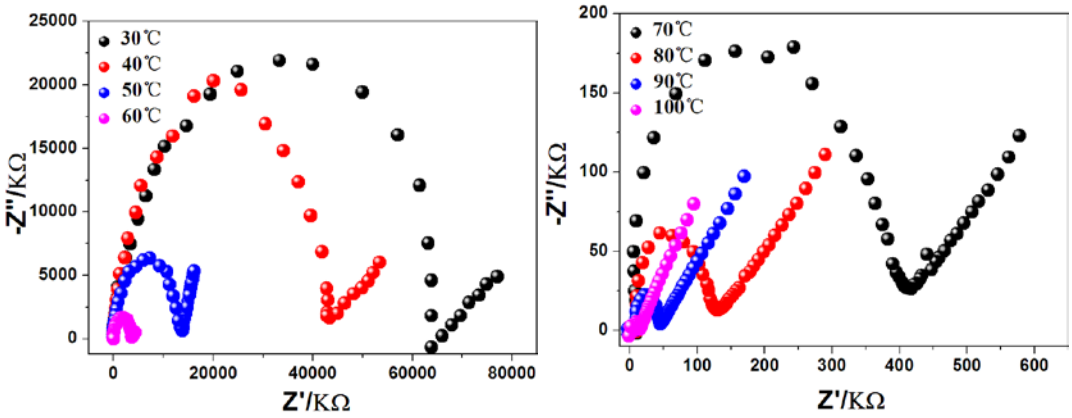


Fig. S10 Impedance spectra of **2** at 75% RH and 30-100 °C.

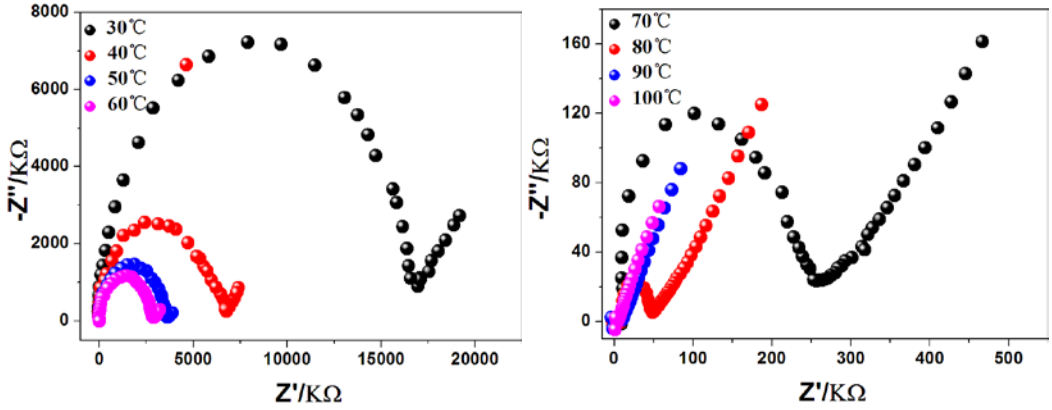


Fig. S11 Impedance spectra of **2** at 85% RH and 30-100 °C.

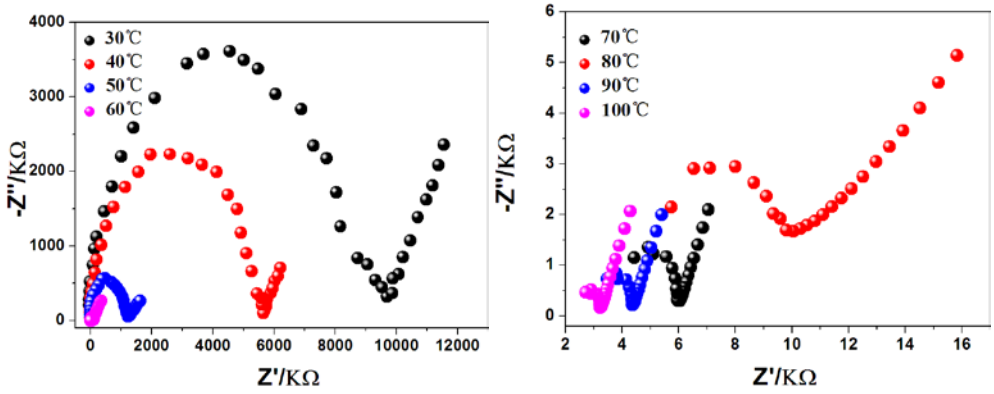
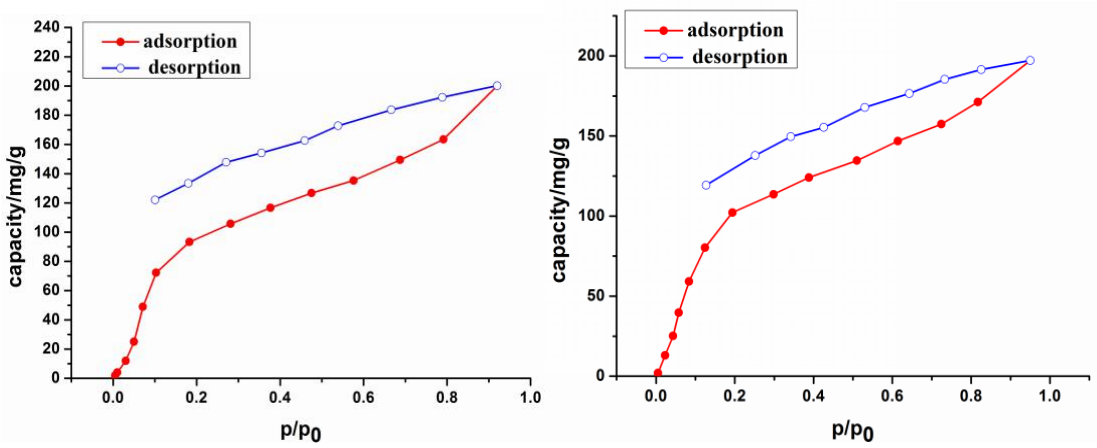


Fig. S12 Impedance spectra of **2** at 93% RH and 30-100 °C.



(a) (b)

Fig. S13 The water adsorption curves of MOFs **1** (a) and **2** (b)**.**

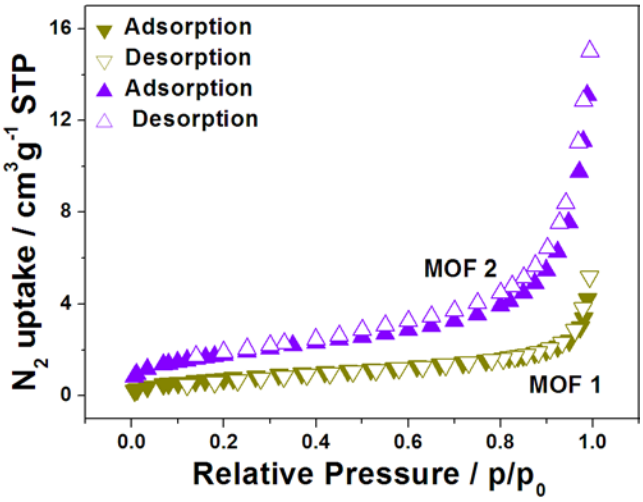
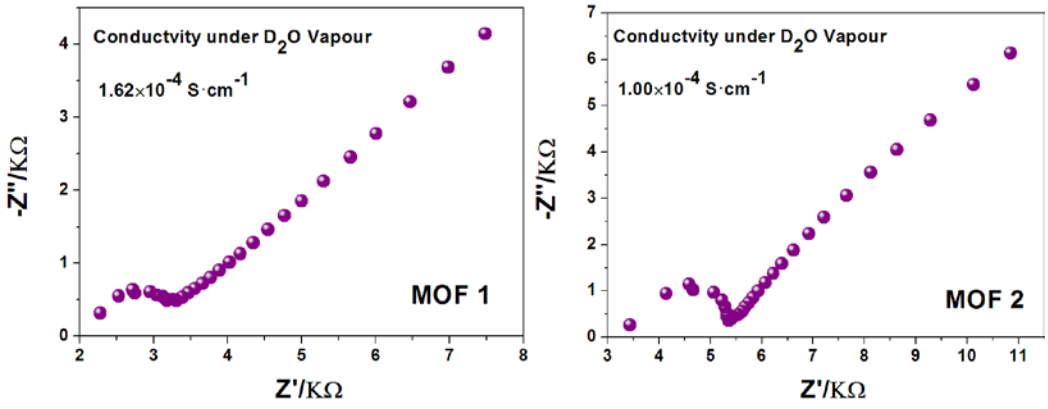


Fig. S14 N_2 adsorption and desorption processes of **1** and **2**.



(a) (b)

Fig. S15 Impedance spectrum of MOFs **1** (a) and **2** (b) in presence of D_2O at 98% RH and 100 °C.